

Remarks

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and the following remarks. Claims 1-40 remain pending. No claims have been allowed. Claims 1 and 39 are independent. Claims 1, 12-14, 22, 23, and 39 have been amended for reasons of clarity and not related to patentability. Claim 20 has been rewritten in independent form.

Patentability of Claims 12, 14-21, and 23-28 under 35 U.S.C. § 112

Claims 12, 14-21, and 23-28 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. These rejections are respectfully traversed.

The Action asserts that the term “the remainder” in claim 12 has insufficient antecedent basis. Claim 12 has been amended. Therefore, Applicants respectfully submit that the 35 U.S.C. § 112 rejection of claim 12 should be withdrawn.

The Action asserts that the term “the identified system state” in claim 14 has insufficient antecedent basis. Applicants have amended claim 14. Therefore, Applicants respectfully submit that the 35 U.S.C. § 112 rejection of claims 14-21 should be withdrawn.

The Action asserts that the term “the state information” in claim 23 has insufficient antecedent basis. Claim 23 has been amended. Therefore, Applicants respectfully submit that the 35 U.S.C. § 112 rejection of claims 23-28 should be withdrawn.

Patentability of Claims 1-5, 7-20, 22-29, 32, 34, 35, 37, 39, and 40 over Rajsuman in view of Klein and in further view of Ferguson under 35 U.S.C. § 103(a)

Claims 1-5, 7-20, 22-29, 32, 34, 35, and 37 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,678,645 to Rajsuman et al. ("Rajsuman") in view of U.S. Patent No. 5,768,567 to Klein et al. ("Klein") and in further view of U.S. Patent No. 3,903,403 to Ferguson et al. ("Ferguson"). These rejections are respectfully traversed.

Claim 1

Independent claim 1 is directed to a method that recites in part: "selectively activating and deactivating a plurality of particular simulation domains that each comprise at least one simulation model in a simulation environment such that a resolution and a performance for a circuit design being simulated is dynamically modified, wherein each of the plurality of particular simulation domains operates at the same time, and wherein each of the plurality of particular simulation domains operates at a different frequency" (emphasis added).

For example, the present application states the following at page 8, lines 13-20:

A circuit design is divided into multiple simulation domains, where each simulation domain contains at least simulation model. Each simulation domain can be selectively activated or deactivated. In one embodiment, each domain provides a particular level of performance and simulation detail or resolution. In which case, by selecting particular combinations of domains, the present invention can alternately increase the sped or resolution of various stages of simulation.

In one embodiment, each domain has its own notion of time. That is, multiple domains can operate at the same time and at different operating frequencies.

The present application also states that "two simulation models can represent the same circuit functionality, but at different abstraction levels having different simulation speeds and levels of resolution" (*see* page 21, lines 7-9).

Rajsuman is understood to describe a method of performing SoC design validation on multiple core functions, but nothing in Rajsuman is understood to teach or suggest a plurality of simulation domains. Rajsuman is understood to have a single simulation domain with multiple models. Moreover, Rajsuman is not understood to suggest a method of selectively activating and deactivating a plurality of particular simulation domains and wherein each of the plurality of particular simulation domains operates at the same time, and wherein each of the plurality of particular simulation domains operates at a different frequency. The Action points to several different sections in Rajsuman but Applicants respectfully submit that none of those sections, nor any other section of Rajsuman, are understood to describe a plurality of particular simulation domains. Where is this shown in Rajsuman?

The Action directs attention to Rajsuman at col. 2, line 9, which states that “hardware-software co-simulation has to be performed.” Applicants respectfully submit that “hardware-software co-simulation” generally refers to joint simulation of hardware and software components of an electronic system and is a concept distinct from simulation domains. The mere mention of hardware-software co-simulation by itself in no way suggests a plurality of simulation domains, let alone selectively activating and deactivating a plurality of particular simulation domains that each comprise at least one simulation model in a simulation environment such that a resolution and a performance for a circuit design being simulated is dynamically modified, wherein each of the plurality of particular simulation domains operates at the same time, and wherein each of the plurality of particular simulation domains operates at a different frequency, as recited in independent claim 1.

The Action also directs attention to Rajsuman at col. 10, lines 15-20, which is understood to describe the storage of event data in two separate manners. Applicants submit that the cited

section actually teaches away from the claimed limitations because the two different timing data mentioned in the section are both related to the same reference clock and thus the same frequency (the frequency of the reference clock). Applicants respectfully submit that nothing in Rajsuman is understood to teach or suggest selectively activating and deactivating a plurality of particular simulation domains that each comprise at least one simulation model in a simulation environment such that a resolution and a performance for a circuit design being simulated is dynamically modified, wherein each of the particular simulation domains operates at the same time, and wherein each of the particular simulation domains operates at a different frequency, as recited in independent claim 1.

Applicants respectfully submit that Klein does not cure the deficiencies of Rajsuman. For example, Klein states that “[i]n accordance to the present invention, co-simulation of a hardware-software system is performed with **a single coherent view** of the memory of the hardware-software system” (col. 2, lines 59-62, emphasis added). Klein also states that “[i]n accordance to the present invention, co-simulation of a hardware-software system is also performed . . . optionally with the co-simulation optimization manager maintaining **a desired clock cycle ratio between hardware and software simulations**” (col. 3, lines 14-20, emphasis added). As such, Applicants respectfully submit that Klein does not teach or suggest a plurality of simulation domains, let alone selectively activating and deactivating a plurality of particular simulation domains that each comprise at least one simulation model in a simulation environment such that a resolution and a performance for a circuit design being simulated is dynamically modified, wherein each of the plurality of particular simulation domains operates at the same time, and wherein each of the plurality of particular simulation domains operates at a different frequency, as recited in independent claim 1.

Applicants respectfully submit that Ferguson does not cure the deficiencies of Rajsuman and Klein. Applicants respectfully note that nothing in Ferguson is understood to teach or suggest a plurality of simulation domains, let alone selectively activating and deactivating a plurality of particular simulation domains that each comprise at least one simulation model in a simulation environment such that a resolution and a performance for a circuit design being simulated is dynamically modified, wherein each of the plurality of particular simulation domains operates at the same time, and wherein each of the plurality of particular simulation domains operates at a different frequency, as recited in independent claim 1.

Therefore, Applicants respectfully submit that Rajsuman, Klein, and Ferguson, either individually or in combination, do not teach or suggest the limitations of independent claim 1. Accordingly, Applicants respectfully submit that the 35 U.S.C. § 103(a) rejection of independent claim 1 should be withdrawn and such action is respectfully requested.

Claims 2-5, 7-20, 22-29, 32, 34, 35, and 37

Dependent claims 2-5, 7-20, 22-29, 32, 34, 35, and 37 depend directly or indirectly from independent claim 1 and are allowable for at least the reasons recited above with respect to their parent claim 1.

Moreover, claims 2-5, 7-20, 22-29, 32, 34, 35, and 37 recite combinations of features that are independently patentable. For example, Applicants respectfully submit that Rajsuman, Klein, and Ferguson, either individually or in combination, do not teach or suggest a plurality of simulation domains, let alone a method “wherein the plurality of simulation domains comprises at least one of a software execution domain, a hardware simulation domain, and an abstract model simulation domain,” as recited in dependent claim 2, a method “wherein each of the

plurality of simulation domains comprises at least one model of a circuit element in the circuit design,” as recited in dependent claim 7, “partitioning the circuit design into the plurality of simulation domains based on a partition criteria,” as recited in dependent claim 8, a method “wherein each of the plurality of simulation domains provides a particular performance level and a particular resolution level,” as recited in dependent claim 13, or a method “wherein the plurality of simulation domains comprise a hierarchical structure,” as recited in dependent claim 22.

Also, Applicants respectfully submit that Rajsuman, Klein, and Ferguson, either individually or in combination, do not teach or suggest a plurality of simulation domains, let alone a method “wherein the plurality of particular simulation domains are selectively activated or deactivated during particular stages of simulation in combinations that either accelerate performance of the simulation environment or increase resolution of the simulation environment,” as recited in dependent claim 13, or a method “wherein selectively activating and deactivating the plurality of particular simulation domains is based on levels of the hierarchical structure,” as recited in dependent claim 22.

Accordingly, Applicants respectfully submit that the 35 U.S.C. § 103(a) rejections of dependent claims 2-5, 7-20, 22-29, 32, 34, 35, and 37 should be withdrawn and such action is respectfully requested.

Claim 39

Independent claim 39 is directed to a machine readable storage medium having stored thereon machine readable instructions that when executed implement a method that recites in part: “selectively activating and deactivating a plurality of particular simulation domains that

each comprise at least one simulation model in a simulation environment such that a resolution and a performance for a circuit design being simulated is dynamically modified, wherein each of the plurality of particular simulation domains operates at the same time, and wherein each of the plurality of particular simulation domains operates at a different frequency” (emphasis added).

Applicants respectfully submit that Rajsuman does not teach or suggest a plurality of simulation domains, let alone selectively activating and deactivating a plurality of particular simulation domains that each comprise at least one simulation model in a simulation environment such that a resolution and a performance for a circuit design being simulated is dynamically modified, wherein each of the plurality of particular simulation domains operates at the same time, and wherein each of the plurality of particular simulation domains operates at a different frequency, as recited in independent claim 39. Applicants respectfully submit that neither Klein nor Ferguson, individually or in combination, cure the deficiencies of Rajsuman.

Therefore, Applicants respectfully submit that Rajsuman, Klein, and Ferguson, individually or in combination, do not teach or suggest the limitations of independent claim 39. Accordingly, Applicants respectfully submit that the 35 U.S.C. § 103(a) rejection of independent claim 39 should be withdrawn and such action is respectfully requested.

Claim 40

Dependent claim 40 depends from independent claim 39 and is allowable for at least the reasons recited above with respect to its parent claim 39. Moreover, claim 40 recites a combination of features that is independently patentable. Accordingly, Applicants respectfully submit that the 35 U.S.C. § 103(a) rejection of dependent claim 40 should be withdrawn and such action is respectfully requested.

***Patentability of Claims 6, 36, and 38 over Rajsuman, Klein, and Ferguson in further view of
Barnett under 35 U.S.C. § 103(a)***

Dependent claims 6, 36, and 38 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Rajsuman, Klein, and Ferguson in further view of U.S. Patent No. 6,223,144 to Barnett et al. (“Barnett”). These rejections are respectfully traversed.

Dependent claims 6, 36, and 38 depend directly or indirectly from independent claim 1 and are allowable for at least the reasons recited above with respect to their parent claim 1. Furthermore, Barnett does not cure the deficiencies of Rajsuman, Klein, and Ferguson. For example, nothing in Barnett is understood to teach or suggest a plurality of simulation domains, let alone selectively activating and deactivating a plurality of particular simulation domains that each comprise at least one simulation model in a simulation environment such that a resolution and a performance for a circuit design being simulated is dynamically modified, wherein each of the plurality of particular simulation domains operates at the same time, and wherein each of the plurality of particular simulation domains operates at a different frequency, as recited in independent claim 1.

Moreover, claims 6, 36, and 38 recite combinations of features that are independently patentable. Accordingly, Applicants respectfully submit that the 35 U.S.C. § 103(a) rejections of dependent claims 6, 36, and 38 should be withdrawn and such action is respectfully requested.

***Patentability of Claim 21 over Rajsuman, Klein, and Ferguson in further view of Rush under
35 U.S.C. § 103(a)***

Dependent claim 21 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Rajsuman, Klein, and Ferguson in further view of U.S. Patent No. 5,742,181 to Rush (“Rush”). This rejection is respectfully traversed.

Dependent claim 21 depends indirectly from independent claim 1 and is allowable for at least the reasons recited above with respect to its parent claim 1. Furthermore, Rush does not cure the deficiencies of Rajsuman, Klein and Ferguson. For example, nothing in Rush is understood to teach or suggest a plurality of simulation domains, let alone selectively activating and deactivating a plurality of particular simulation domains that each comprise at least one simulation model in a simulation environment such that a resolution and a performance for a circuit design being simulated is dynamically modified, wherein each of the plurality of particular simulation domains operates at the same time, and wherein each of the plurality of particular simulation domains operates at a different frequency, as recited in independent claim 1.

Moreover, claim 21 recites a combination of features that is independently patentable. Accordingly, Applicants respectfully submit that the 35 U.S.C. § 103(a) rejection of dependent claim 21 should be withdrawn and such action is respectfully requested.

***Patentability of Claims 30, 31, and 33 over Rajsuman, Klein, and Ferguson in further view of
Patel under 35 U.S.C. § 103(a)***

Dependent claims 30, 31, and 33 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Rajsuman, Klein, and Ferguson in further view of U.S. Patent No. 5,546,562 to Patel (“Patel”). These rejections are respectfully traversed.

Dependent claims 30, 31, and 33 depend directly or indirectly from independent claim 1 and are allowable for at least the reasons recited above with respect to their parent claim 1. Furthermore, Patel does not cure the deficiencies of Rajsuman, Klein, and Ferguson. For example, nothing in Patel is understood to teach or suggest a plurality of simulation domains, let alone selectively activating and deactivating a plurality of particular simulation domains that each comprise at least one simulation model in a simulation environment such that a resolution and a performance for a circuit design being simulated is dynamically modified, wherein each of the plurality of particular simulation domains operates at the same time, and wherein each of the plurality of particular simulation domains operates at a different frequency, as recited in independent claim 1.

Moreover, claims 30, 31, and 33 recite combinations of features that are independently patentable. Accordingly, Applicants respectfully submit that the 35 U.S.C. § 103(a) rejections of dependent claims 30, 31, and 33 should be withdrawn and such action is respectfully requested.

Request for Interview

If any issues remain, the Examiner is formally requested to contact the undersigned attorney prior to issuance of the next Office Action in order to arrange a telephonic interview. It is believed that a brief discussion of the merits of the present application may expedite prosecution. Applicants submit the foregoing Response so that the Examiner may fully evaluate Applicants' position, thereby enabling the interview to be more focused.

This request is being made under MPEP § 713.01, which indicates that an interview may be arranged in advance by a written request.

Conclusion

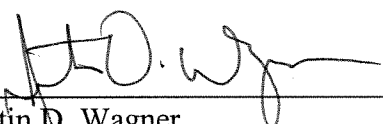
The claims in their present form should be allowed. Such action is respectfully requested.

Respectfully submitted,

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